(f)] distinct from the local time lines so as to initiate re-mapping of said start time and duration of each said clip objects represented by said meta-clip [object] objects according to the relative positioning of said local time [line] lines and said global time line.

--REMARKS--

In the Office Action, the Examiner objected to the title for failing to clearly describe the invention. In response, the Applicant has amended the title as set out above.

Claims 1 to 11 are presently pending in the subject patent application, and stand rejected under 35 USC 103(a) in view of Hill (US 5,930,797) and Hamakawa (Hamakawa and Rekimoto, "Object Composition and Playback Models for Handling Multimedia Data", International Media Conference, Proceedings of the Conference on Multimedia '93, August 2 - 6, 1993). In response to the Office Action, the Applicant has amended independent claims 1, 4 and 11, as set out above. The Applicant now submits that the invention, as defined in claims 1 to 11, patentably distinguishes over the cited prior art. The basis of the Applicant's position will be explained in the following paragraphs.

Rejection of Claims 1 to 3

Independent claim 1 of the subject patent application relates to a method for accessing and manipulating time-based data. The claimed method (as amended herein) comprises the steps of:

(i) selecting a first time-based data source comprising a first data type from a selection of available data sources;

(ii) positioning a first clip object representing said first time-based data source with respect to a local time line to define a start time and duration relative to the local time line for accessing said first time-based data source;

(iii) selecting a second time-based data source from said selection of available data sources, said second time-based data source being of a different data type than said first time-based data source;

(iv) positioning a second clip object representing said second time-based data source with respect to said local time line to define a start time and duration relative to the local time line for accessing said second time-based data source;

(v) creating at least one meta-clip object representing said local time line and said first and second clip objects positioned relative thereto, said at least one meta-clip object being positionable with respect to a global time line of an edit, distinct from said local time line, such that the start time and duration of each of said first and second clip objects in said at least one meta-clip are re-mapped to said global time line upon said at least one meta-clip being positioned relative to the global time line; and

(vi) adding said at least one meta-clip object to said list of available data sources.

A distinguishing feature of the present invention, as defined in amended claim 1, is that the clip objects comprising the meta-clip object are associated with a time line which is local to each meta-clip, but at the same time distinct from the global time line used to define the edit. By defining an edit in this manner, the relationship between a group of associated data types can be maintained, even if the group of data types is translated or scaled in time. Another distinguishing feature of the present invention is that the group of associated data types, so defined, is stored as part of a pool of available data sources, thereby facilitating the development of more complex data types, including more complex meta-clips. None of the prior art references cited by the Examiner teach or suggest an invention which includes these features.

Hill (US 5,930,797)

Hill teaches a method of representing hierarchical time-based data of an edit to increase the efficiency of a rendering process. The method involves representing each edit track of the edit as a hierarchy of objects within a media container, creating a minimum set of virtual static graphs from the media container and then outputting the graphs to a rendering engine. As the patentee discloses at column 6, line 54 to column 7, line 16 of the patent, a media container comprises a hierarchy of source objects, effects objects, filter objects and masks arranged in layers, constrained such that an object in any given layer cannot receive input from another object in the

same layer or from an object in a higher layer. The media container also includes a layer multiplexer for each layer for maintaining a record of the active/inactive state of each object in the layer at any given time, and the active/inactive state of each object in adjacent lower layer.

Once the media container is defined, a minimum number of virtual static graphs is created to determine the outputs which are required to be applied to the rendering engine at any given time. As the patentee discloses at column 9, line 57 to column 10, line 48 of the patent, virtual static graphs are created by first identifying transitions (ie the instant when the state of an object changes), and then for each duration between adjacent transitions determining whether the required output for the duration is a source object or an effect/filter object. If the required output is a source object(s), then a virtual static graph for the duration is created from the source object(s). However, if the required output is an effect object or a filter object, the layer multiplexer associated with the output object is studied to determine whether the objects which provide inputs to the output object are available. If a required input is available, then a virtual static graph for the duration is created using the input object. On the other hand, if the required input is not available, the layer multiplexer of each subsequently lower layer is examined until the required input is found available, and a virtual static graph for the duration is created from the intervening objects.

As will be apparent from the foregoing description, Hill does not teach a method for accessing and manipulating time-based data which involves the step of creating one or more meta-clip objects by positioning clip objects representing respective time-based data sources relative to a local time line, with each meta-clip object being positionable relative to a global edit time line which is distinct from the local time lines, as recited in amended claim 1 of the subject patent application. Further, Hill does not teach a method for accessing and manipulating time-based data, which involves the step of including the meta-clips, so created, as part of a pool of available data sources which can be used for the creation of an edit. Instead, Hill discloses a media container which includes either source objects or effect/filter objects all disposed relative to a global edit time line, without any of the objects making reference to a local time line. Also, as

the patentee discloses at column 6, lines 50 to 53 of the patent, a container is not saved once the edit itself is saved. Consequently, the invention recited in amended claim 1 of the subject patent application is not anticipated by Hill.

Hamakawa (Object Composition and Playback Models for Handling Multimedia Data)
Hamakawa teaches an object-oriented composite model for handling multimedia data. As the author describes at pg. 274 of the publication, the composite object comprises a hierarchical arrangement of multimedia objects, each having glue attributes (normal, stretch, shrink) in three dimensions (two dimensional position, time). In addition to the glue attributes, each multimedia object has associated therewith data type information, and location information specifying the relative location (in terms of time and space) of the object relative to other multimedia objects. Once the objects are composed, their respective absolute locations (in terms of time and space) are then calculated, with the time length of each object comprising the composite object being determined from the time length of the composite object. If the attribute values of an object is subsequently changed, the attribute values of the other objects must be recalculated, in accordance with the object hierarchy.

As will be apparent from the foregoing description, Hamakawa does not teach a method for accessing and manipulating time-based data, which involves the step of creating one or more meta-clip objects by positioning clip objects representing respective time-based data sources relative to a local time line, with each meta-clip object being positionable relative to a global edit time line which is distinct from the local time lines, as recited in amended claim 1 of the subject patent application. Instead, Hamakawa discloses an object-oriented composite model which differs from the conventional time line model in that users do not specify the absolute location of the objects. As the author discloses at page 274, rather than specifying the location of each object relative to a global edit time line, the users specify the location of each object relative to the other objects in the object hierarchy. Although Hamakawa discloses that once objects are defined, their absolute locations (in terms of time and space) are calculated, Hamakawa does not make use of a local time line to locate one or more associated clip objects (ie. meta-clip objects)

and a global time line to locate one or more meta-clip objects. Consequently, the invention recited in amended claim 1 of the subject patent application is not anticipated by Hamakawa.

The Applicant also submits that the invention recited in amended claim 1 of the subject patent application is not obvious in light of Hill and Hamakawa. The initial basis for the Applicant's position is that for a modified prior art reference to properly form the basis of a prima facie obviousness rejection, there must be some suggestion in the prior art for the modification. As the Applicant discusses below, the required suggestion is lacking.

As discussed above, amended claim 1 relates to a method for accessing and manipulating time-based data, which involves the steps of:

selecting at least two time-based data sources from a selection of available data sources, and positioning clip objects representing the respective data sources with respect to a local time line to define a start time and duration relative to the local time line for accessing each data source;

creating at least one meta-clip object representing the local time line and the clip objects positioned relative thereto, with the meta-clip object being positionable with respect to a global time line of an edit, distinct from said local time line, such that the start time and duration of each clip object in each meta-clip are re-mapped to the global time line when the meta-clips are positioned relative to the global time line; and

adding each meta-clip object to the list of available data sources.

In contrast, although Hill also relates to a method for representing and accessing time-based data which involves the steps of selecting time-based data sources from a selection of available data sources, and positioning within a media container a hierarchy of objects representing the selected data sources with respect to a time line to define a start time and duration relative to the time line for accessing each data source, Hill fails to disclose the step of creating meta-clip objects each comprising a collection of clip objects disposed relative to a local time line, with each meta-clip object being positionable relative to a global edit time line distinct from the local time lines, as

recited in amended claim 1 of the subject patent application. The Applicant notes that the Examiner stated that Hamakawa disclosed the use of a composite object comprising multimedia objects, each with its own relative time line, temporally re-mapped with respect to a global time line. However, this statement is incorrect. As the Applicant discussed above, at page 274 of the publication Hamakawa disclosed that, rather than specifying the location of each object relative to a time line, the users only specify the location of each object relative to the other objects in the object hierarchy. Although Hamakawa discloses that once objects are defined, their absolute locations (in terms of time and space) are calculated, Hamakawa does not make use of a local time line to locate one or more associated clip objects of a group of objects and a global time line to locate one or more groups of objects, as employed by the invention recited in amended claim 1 of the subject patent application. Instead, Hamakawa makes use of the relative locations in time and space between objects to remap the objects to a common global time line. Consequently, the written disclosure of Hamakawa cannot be used as basis to conclude that a person of ordinary skill would be motivated to modify the teaching of Hill to make use of both respective local time lines for objects comprising composite objects and a global time line for the composite objects.

The Applicant also notes that the Examiner referred to Figure 4 of Hamakawa as an example of temporal re-mapping of objects from their own time line to a global time line. However, as Hamakawa explained at page 274 of the publication, Figure 4 merely depicts a mechanism for determining the absolute location (time and space) of a composite object comprising a number of multimedia objects. Although Figure 4 does depict a time line, the depicted time line is the absolute (global) time line of the edit. Figure 4 does not depict one or more clip objects of a group of objects all associated with a common local time line, and one or more groups of objects all associated with a global time line for the edit, as required by the invention recited in amended claim 1. Consequently, the drawings in Hamakawa cannot be used as basis to conclude that a person of ordinary skill would be motivated to modify the teaching of Hill to make use of both respective local time lines for objects comprising composite objects and a global time line for the composite objects.

The Applicant does note that the Examiner concluded that a person of ordinary skill would be motivated to apply the teaching of Hamakawa to the teaching of Hill due to "Hamakawa's taught advantage of automatic temporal re-mapping of time lines within groupings of multimedia objects, providing increased convenience (due to the elimination for precise time line locations)". However, as the Applicant explained above, Hamakawa does not make use of time lines local to a group of multimedia objects and a separate global time line for the edit, but instead simply determines the locations in time and space of objects relative to other objects (absent any local time line) and then remaps the relative locations of the objects to a global time line. Consequently, the requisite suggestion in the prior art for the modification of Hill to make use of a collection of clip objects disposed relative to a local time line, with each collection of clip objects being positionable relative to a global edit time line distinct from the local time lines is entirely lacking.

The Applicant also points out that at column 2, lines 26 to 41 and at column 5, lines 45 to 48 of the patent, Hill disclosed that since a NLE edit can include many source data clips, effects objects and filter objects, the computational analysis necessary to render the edit can be computationally expensive, particularly if the edit includes redundant interconnections and/or data elements. To reduce the computational overhead required for the rendering of an edit, Hill required that a minimum set of virtual static graphs be created for output to the rendering system. However, if the source, filter or effect objects in any layer of the media container taught by Hill were replaced by composite objects, such as the composite model taught by Hamakawa, it would be possible for the number of virtual static graphs to be other than minimum since two composite objects in any given layer of the media container could include some of the same interconnections and/or some of the same source, effect and/or filter objects, thereby passing to the rendering system an edit comprising possibly redundant interconnections and/or data elements. Although this problem might be solved by "expanding" each composite object into its constituent multimedia objects prior to inclusion in the media container, the requisite expansion of each composite object would be computationally expensive, particularly since Hill does not save media containers after the edit itself is saved.

Further, the composite model taught by Hamakawa is not particularly conducive to a computationally efficient dynamically editable rendering system. As discussed above, Hamakawa discloses a static composite object model which requires that users specify the locations in time and space of each multimedia object comprising the composite object relative to the other multimedia objects comprising the composite object (absent any local time line), prior to remapping the relative locations to a global time line. Although such a model might be suitable for defining complex static objects, it is not suitable for applications requiring the composite models to be dynamically modified (except for variations in object's glue attributes) since if the user repositioned one multimedia object in the composite object, the user would also have to reposition all the other multimedia objects in the composite object whose locations were originally defined with respect to the repositioned multimedia object. Since edits generally include a large number of clips, the requirement to reposition multiple associated clips every time a change is made to a clip could make editing very time consuming. Accordingly, not only does the prior art fail to suggest modifying Hill to make use of a collection of clip objects disposed relative to a local time line, with each collection of clip objects being positionable relative to a global edit time line distinct from the local time lines, but the prior art teaches away from the notion of modifying the teaching of Hill to incorporate the teaching of Hamakawa.

Summarizing the foregoing, the prior art fails to disclose a method for accessing and manipulating time-based data which involves the step of creating one or more meta-clip objects by positioning clip objects representing respective time-based data sources relative to a local time line, with each meta-clip object being positionable relative to a global edit time line which is distinct from the local time lines, as recited in amended claim 1 of the subject patent application. Although Hill relates to a method for representing and accessing time-based data which involves the steps of selecting time-based data sources from a selection of available data sources, and positioning within a media container a hierarchy of objects representing the selected data sources with respect to a time line, the prior art fails to suggest modifying Hill to make use of a collection of clip objects disposed relative to a local time line, with each collection of clip objects being positionable relative to a global edit time line distinct from the local time lines.

Further, the prior art actually teaches away from modifying Hill to make use of predefined composite objects, such as the composite model taught by Hamakawa. Therefore, Hill cannot be properly used as the basis of a prima facie obviousness rejection of the invention recited in amended claim 1 of the subject patent application. Accordingly, the Applicant submits that the invention recited in amended claim 1 is not obvious in view of the cited references.

As claims 2 to 3 depend from independent claim 1, the foregoing arguments apply equally to claims 2 to 3. Accordingly, the Applicant respectfully requests that the Examiner's rejection of claims 1 to 3 be withdrawn.

Rejection of Claims 4 to 10

Independent claim 4 of the subject patent application relates to a method of defining an edit comprising time-based data disposed relative to a global time line. The claimed method (as amended herein) comprises the steps of:

(i) creating at least one meta-clip object each comprising a respective local time line distinct from the global time line, a first clip object representing a first time-based data source selected from a list of available data sources, and a second clip object representing a second time-based data source selected from the list of available data sources, the second data source being of a different data type than the first data source, the first and second clip objects being positioned relative to the local time line to define a respective start time and duration relative to the local time line for accessing each said selected data source;

(ii) adding said at least one meta-clip object to said list of available data sources;

(iii) selecting at least one of the meta-clip objects from said list of available data sources and positioning said at least one selected meta-clip object with respect to the global time line; and

(iv) re-mapping to the global time line the start time and duration of the clip objects comprising each said selected meta-clip object in accordance with the position of each said selected meta-clip object relative to the global time line.

The Examiner will note that claim 4 has been amended to conform substantially to amended claim 1. In particular, amended claim 4 recites the steps of:

creating at least one meta-clip object each comprising a respective local time line, a first clip object representing a first time-based data source selected from a list of available data sources, and a second clip object representing a second time-based data source selected from the list of available data sources, with the second data source being of a different data type than the first data source;

adding the meta-clip object to the list of available data sources; and

selecting at least one of the meta-clip objects from the list of available data sources and positioning the meta-clip relative to a global (edit) time line.

In view of the substantial similarity between amended claim 4 and amended claim 1, the foregoing arguments apply equally to the invention defined in amended claim 4. Accordingly, the Applicant submits that the invention recited in amended claim 4 is neither anticipated nor obviousness in view of the cited references.

As claims 5 to 10 depend from independent claim 4, the foregoing arguments apply equally to claims 5 to 10. Accordingly, the Applicant respectfully requests that the Examiner's rejection of claims 4 to 10 be withdrawn.

Rejection of Claim 11

Independent claim 11 of the subject patent application relates to a non-linear editing system for creating an edit by accessing and manipulating time-based data. The claimed system (as amended herein) comprises:

a storage device to store time-based data sources;

a computer operatively connected to said storage device to access said time-base data sources stored therein;

at least one output device to display to a user a graphical user interface of an NLE program executed by said computer and to output the result of said edit to said user; and

at least one user input device to receive input for said NLE program from a user, said input being configured to:

(a) create with the computer at least one meta-clip object each comprising a respective local time line, a first object representing a first one of the stored data sources, a second object representing a second one of the stored data sources, the second data source being of a different data type than thefirst data source, the clip objects being positioned relative to the local time line to define a respective start time and duration relative to the local time line for accessing each said data source;

(b) select with the computer at least one of the meta-clip objects; and

(c) define with the computer the positioning of each said selected meta-clip object relative to a global time line distinct from the local time lines so as to initiate re-mapping of said start time and duration of each said clip objects represented by said meta-clip objects according to the relative positioning of said local time lines and said global time line.

The Examiner will note that claim 11 has been amended to conform substantially to amended claim 1. In particular, amended claim 11 recites an input device which is configured to:

create at least one meta-clip object each comprising a respective local time line, a first object representing a first one of the stored data sources, a second object representing a second one of the stored data sources, the second data source being of a different data type than thefirst data source;

select at least one of the meta-clip objects; and

define the positioning of each selected meta-clip object relative to a global time line distinct from the local time lines so as to initiate re-mapping of the start time and duration of the clip objects represented by the meta-clip objects according to the relative positioning of the local time lines and the global time line.

In view of the substantial similarity between amended claim 11 and amended claim 1, the foregoing arguments apply equally to the invention defined in amended claim 11. Accordingly, the Applicant submits that the invention recited in amended claim 11 is neither anticipated nor

obviousness in view of the cited references. Accordingly, the Applicant respectfully requests that the Examiner's rejection of claim 11 be withdrawn.

Favourable reconsideration of the subject patent application is respectfully requested.

If any additional fees are required by any of the foregoing amendments or submissions, permission is hereby granted to debit our deposit account number 07-1750.

If the Examiner wishes to discuss any aspect of this amendment, please contact the Applicant's patent agent, Mr. Robert Graham, at (416) 862-4425.

Respectfully submitted,

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Re United States Patent Application No. 09/063,289
Applicant: Gagne et al.
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